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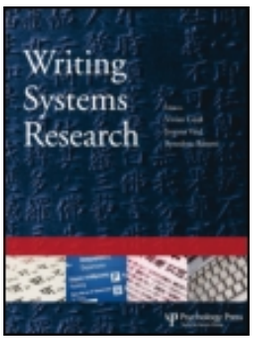

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The effect of L1 orthography on the oral reading of adult English language learners

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A descriptive study of the timed oral reading of 232 literate adult English language learners (ELLs) in a post-secondary academic program found a relationship between the proximity of their L1 orthography to English and their performance in a timed oral reading. The scores on the students' final exams and final listening exams, on the other hand, did not correlate with their first language orthography. The author concludes that for literate ELLs, L1 orthography exerts an influence on oral reading in English, and therefore should be factored in when designing assessments that employ such a method.

Keywords: Oral reading; Reading fluency; Orthography; Reading comprehension; Curriculum based measurement; Automaticity theory; English language learners.

PROBLEM STATEMENT

Lems (2005) looked at the oral reading of adult English language learners (ELLs) in a post-secondary academic program to explore whether there might be a correlation between their oral and silent reading such as has been found in studies of L1 English-speaking children (Fuchs, Fuchs, Hosp, & Jenkins, 2001) and found a mild-to-moderate correlation. It was also found that the correlation between oral and silent reading became stronger as English proficiency increased.

The impressively high correlations between oral reading and silent reading comprehension scores among L1 English readers and the relative ease of administering curriculum-based oral reading assessment have led to their use in many reading assessments (Deno, 1985; Fuchs et al., 2001), ranging from running records to The Diagnostic Indicators of Basic Early Literacy Skills (DIBELS) and assessments for Response to Intervention (RTI). The scores on these assessments are used in a wide variety of contexts. At their most local, they may serve to place students in flexible reading groups; at the other end, they may be factored into hiring decisions about teachers or even the legal standing of a school, which must comply with various acts of law.

The research base for using oral reading scores to make decisions about ELLs is not well-established although ELLs are mixed among the participants in many oral

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reading studies (e.g., Hiebert & Fisher, 2006). Because ELLs are often classified as "at-risk" readers when they are integrated into English classrooms, it is important to be able to distinguish whether their scores indicate a need for special services or if they are simply moving along normally in their second language acquisition. One place to find the answer might be in the study of their oral reading and the contribution their L1 orthography might make to it.

L1 ENGLISH FLUENCY

There is considerable research validating the use of a timed oral reading passage as a "snapshot" (Blachowicz, Sullivan, & Cieply, 2001) of reading comprehension for native English-speaking children (henceforth referred to as "L1 English" children). There is high criterion validity for oral reading as measure of reading comprehension for L1 English children (Deno, Mirkin, & Chiang, 1982; Hintze et al., 1997). Oral reading samples have been shown to correlate at a high enough level with silent reading to be able to distinguish students with learning disabilities from students from impoverished socio-economic backgrounds or in general education (Deno, Marston, Shinn, & Tindal, 1983). Fuchs, Fuchs, and Maxwell (1988) found stronger correlations between oral reading scores and standardised tests of reading comprehension than among the sections of standardised reading tests themselves. Hintze et al. (1997) and Fuchs and Deno (1992) found oral reading to be a robust measure of reading comprehension whether the reading program was basal, literature based, or whole language based. Hintze et al. (1997) conclude that "regardless of the type of material used, the criterion validity of the oral reading metric was substantial".

Markell and Deno (1997) found that, in general, students read fewer words on more difficult material and more words on easier material in oral reading. A confirmatory study by Shinn, Knutson, Good, Tilly, and Collins (1992) found that oral reading rate correlated highly with any and all measures of reading comprehension and concluded that "[curriculum-based measurement of] oral reading fluency fits current theoretical models of reading well and can be validated as a measure of general reading achievement, including comprehension . . ." (Shinn et al., 1992, p. 476).

It was also found that the relationship between oral reading and silent reading comprehension declines as reading level increases:

> As the learner gains word recognition skills, there is increasing potential for other factors to influence comprehension, hence for a loosening of the link between decoding and comprehension. Thus, as reading skill advances, we could expect a decrease in the correlation of decoding with reading comprehension and a corresponding increase in the correlation of listening and reading comprehension (Shankweiler et al., 1999, p. 74).

Espin and Foegen (1996) confirmed that, by secondary school, general literacy level and ability to engage in higher order thinking skills had eclipsed the importance of oral reading, and vocabulary strength was more predictive of content comprehension than oral reading. Espin and Deno (1993) found that oral reading correlated only moderately with information-locating skills in more mature readers. Fuchs et al. (2001) mention a "developmental trajectory of oral reading fluency [which] involves greatest growth in the primary grades, with a negatively accelerating curve through the intermediate grades and perhaps into high school" (p. 240). Kuhn and Stahl (2000), in a meta-analysis of fluency instruction studies, found that students who are already

established readers do not seem to benefit from fluency practice to the same extent as younger students.

WORD CALLING

Readers who decode well but are weak in reading comprehension are often referred to as word callers. Weak comprehension skills could be attributed to several factors: poor working memory, lack of background knowledge, a diagnosis of a reading disability called hyperlexia, which consists of fluent decoding without construction of meaning, or weak listening comprehension skills. Dymock (1993) looked at the listening comprehension of L1 English middle school students with good decoding but poor comprehension skills. She wanted to test whether they were so preoccupied with decoding that it detracted from their ability to construct meaning from text. If that were the case, their listening comprehension scores would be higher than their reading comprehension scores. If, on the other hand, their listening comprehension scores were also weak, cognitive factors unrelated to reading could be at work. Dymock found that readers with poor comprehension also had poor scores on listening comprehension; she concludes: "This study provided support for the Stanovich and Gough/Tunmer positions that once a child has become a good decoder, differences in reading ability will reflect differences in listening ability" (p. 90).

Hamilton and Shinn (2000) asked teachers to identify third graders they considered word callers and to make predictions about their reading comprehension rates, both oral and silent. The study showed that children identified by teachers as word callers read more slowly and had lower silent reading comprehension scores than teachers had predicted. Oral reading scores correlated equally well for the students teachers considered word callers and the rest of the students; the authors conclude that the designation "word caller" may be a subjective phenomenon, based on ranking within a class but not on overall reading proficiency.

However, teachers report that their ELL students, in particular, the Spanish-language ELLs, can read aloud very well, but with little or no comprehension of what they have just read (Lems, 2011). Part of this impression may come from the mistaken notion that fluency can be measured by how well a student can read a passage and then discuss the meaning of that same passage, which was not the method used in original fluency research. In fluency validation studies, children were not asked comprehension questions about the oral reading they had just performed; their oral reading was correlated with reading comprehension questions about a different passage. In fact, Rasinski (1990) cautioned that comprehension assessments done after oral reading "cast suspicion on the practice of having students retell what they can recall from a passage they have read orally" (p. 43).

TRANSPARENT AND OPAQUE ORTHOGRAPHIES

All writing systems are an attempt to capture and record speech; however, the level of detail of the phonetic information contained in them varies considerably. Writing systems in which there is a close fit between the written and spoken form of the language, which look like they sound, are referred to as "transparent orthographies". Writing systems in which the symbols and sounds of a language are not in close coincidence, which instead look like they mean, can be referred to as "opaque orthographies". Transparent orthographies are "user friendly"; it is easy to decode and

pronounce new words once the letter and sound combinations have been learned. Opaque orthographies, on the other hand, take longer to learn and require a reader to look at other cues besides phonological ones as a guide to meaning (Ellis et al., 2004). Examples of largely transparent orthographies are: Polish, Spanish, Italian, Rumanian, Turkish, Korean, and Japanese Hiragana and Katakana. Examples of more opaque orthographies include English, French, and Chinese. Other languages fall somewhere along a continuum.

It is important to mention that the grapheme–phoneme correspondence differs according to the direction in which the endeavour is proceeding: from sound to symbol or from symbol to sound. To illustrate the difference, let us look at English. The "long a" sound (or /ey/ in the International Phonetic Alphabet) can be found in several spelling patterns in English: day, grey, weigh, take, aid, and so on. Students learning how to write and spell in English need to know which of the spelling patterns is operant when they try to represent a word with a "long a" sound. This process proceeds from the sound to the symbol, and it is critical in learning to write and spell. However, when students are trying to decode a word, the knowledge of spellings for "long a" is not necessarily useful and can even be confusing. Now, they are looking for possible pronunciations of a letter instead. The letter a, for example, may be pronounced in many ways, as we can see in this group of words: all, add, ate, ago, toad, and so on. Students need to access a letter's possible sounds to decode the word it is part of. This process proceeds from the symbol to the sound, and it is critical in learning to read.

Some orthographies are easier to decode (going from symbol to sound), whereas others may be easier to recode or encode (going from sound to symbol). English is opaque in both directions: it requires learning a number of possible options for both letter choice and sound choice in order, both to read it and to write it (Lems, Miller, & Soro, 2010).

ORTHOGRAPHIC DEPTH HYPOTHESIS

Katz and Frost's (1992) orthographic depth hypothesis predicts that children from transparent orthographies will learn to read more quickly than children from opaque orthographies. In addition, children will employ different strategies in learning to read, depending on their first language orthography. This hypothesis has been confirmed in cross-linguistic research done by Ellis et al. (2004). Children learning to read in transparent orthographies, in which the sounds and symbols are closely matched, relied more on phonological information to decode words, whereas children learning to read in opaque orthographies, in which there is no close match between sounds and symbols, relied more upon semantic clues found within the words themselves. Also, transparent alphabet readers read longer words more slowly, whereas the length of a word did not affect reading speed for those from an opaque orthography. In addition, oral readers from transparent orthographies demonstrated a higher number of nonsense word substitutions than oral readers from opaque orthographies, who were more likely to substitute semantically-similar words that looked less like the word on which they had miscued. Because there were more incidences of nonsense word miscues by readers from transparent orthographies, this suggests that it may be easier to be a "word caller", reading fluently but with little comprehension, when reading in a transparent orthography.

An article published in *Nature Neuroscience*, for example, demonstrated that Italians, whose orthography is transparent, were considerably faster in reading words and

non-words aloud in their language than English readers. Positive Emission Tomography (PET) scans of their brains while reading showed that the portion of the brain processing phonological information was greater for Italians, while the part of the brain used for naming objects and processing the meaning of words was used more with English speakers (Paulesu et al., 2000).

However, opaque orthography languages make up for their phonetic inconsistencies by conveying a large amount of morphological information. Due to the opaque orthography of English, spelling patterns may not match pronunciation patterns, but do give clues to meaning through their morphemes. Benczik (2001) points out educational systems whose languages use opaque orthographies tend to include the teaching of spelling and the study of grammar as part of the reading process. Bear, Templeton, Helman, and Baren (2004) reach a similar conclusion and detail the ways in which first language orthography affects the trajectory of spelling development in English.

THE STUDY

Participants in the study consisted of 232 adult immigrants studying in An English to Speakers of Other Languages (ESOL) program at a medium-sized metropolitan university in the American Midwest. The ESOL program consisted of a 14 hour per week, five-level academic program. Students were initially placed by means of an oral interview, short multiple choice grammar test, and writing sample. Each course lasted 10 weeks (8 weeks during the summer). The program used a grammar-based approach. It offered morning, evening, and weekend classes.

Because all the participants were high school graduates, it could be assumed they had academic language skills in their L1, but there was variance in how recently they had been students and in the quality of education that they had received in their native land.

L1 ORTHOGRAPHIES REPRESENTED IN THE STUDY

Of the 232 students in the study, three major orthographic backgrounds were represented, as can be seen in Table 1.

The Roman alphabet is represented by the most students overall, with Spanish- and Polish-speaking students forming the largest numbers. The Ukrainians and Bulgarians used Cyrillic, a non-cognate, alphabetic writing system; and the Chinese have a syllable-based logographic system with a phonological component (Li, 2002) but not an alphabet, nor any cognate words with English (Pang & Kamil, 2003).

The sample group is represented in Table 2, which breaks down the participants by level in the program and by L1.

TABLE 1
Participant characteristics by L1 and L1 orthographic system

First language	*Number (%)*	*Orthography*	*Transparency*
Polish	143 (61.6)	Roman alphabet	Transparent
Ukrainian	33 (14.2)	Cyrillic alphabet	Transparent
Chinese	23 (9.9)	Logosyllabic	Opaque
Spanish (Mexican)	14 (6.0)	Roman alphabet	Transparent
Bulgarian	9 (3.9)	Cyrillic alphabet	Opaque
Other	10 (4.3)		
Total	232 (100)		

TABLE 2
Participants by level and first language ($N = 232$)

First language	*Level 1*	*Level 3*	*Level 5*
Polish	5	88	50
Ukrainian	4	26	3
Chinese	0	18	5
Spanish	1	12	1
Bulgarian	3	5	1
Other languages	1	5	4
Total	14	154	54

INSTRUMENTS AND PROCEDURE

Students read a passage aloud for 1 minute, after an open ended oral interview. The passage reading was taped and later scored for correct words per minute by the researcher. Reading comprehension was measured at a different time and place from the oral reading sample (Cervetti, Jaynes, & Pearson, 2002, p. 8). Rasinski notes that, in oral reading assessment, ''readers often channel their attention and cognitive energy into decoding and allocate little attention to understanding the passage'', especially on a ''cold'' reading with unfamiliar text (1990, p. 41). As a result, comprehension measures taken immediately after oral reading may not give an accurate picture of reading comprehension (p. 42).

The oral reading passage used was a 721 word article taken from the popular ESL text, ''Even More True Stories: an Intermediate Reader'' (second edition) (Heyer, 2000). The book, but not the chapter chosen, is used as the Level 3 reader in the ESL program. The oral reading passage was scored for readability using the Fry readability formula (Fry, 1977) and the Flesch–Kincaid readability level (Word 6.0 software).

The readability levels of the reading comprehension sections of the three final exams were calculated using the same two readability scales. Although L1 English readability formulas have not been validated for ELLs, Greenfield (1999) and Jacob (2002) have found them reasonably valid when adapted to specific situations. The passage difficulty level of the oral reading given to all 232 students was similar to the difficulty level of the passage used in the Level 3 exam. The readability levels can be seen in Table 3. The numbers in the scales indicate grade and month in school for a typically developing L1 English learner.

The miscue coding in the study was established through a written miscue-coding key based specifically on the passage. It deducted omissions, substitutions (including nonsense words, mispronunciations resulting in incomprehensible words, and partial

TABLE 3
Passage length and readability levels for reading sections of Levels 1, 3, and 5 final exams and passage used in oral reading

Level	*Number of words*	*Words per sentence*	*Fry readability*	*Flesch–Kincaid*
1	151	7.9	2.1	2.7
3	257	8.7	6.1	4.1
5	580	22.8	11	12
Passage	715	12.0	6.1	5.1

Fry (1977); Microsoft Word 6.0 software (1998).

renderings), and extra words. It did not deduct self-corrections, pauses, false starts, identifiable words spoken with a "foreign accent", or unnatural intonation patterns.

The recording took place as part of the oral interviews which were given routinely in the ESOL program at the end of Levels 3 and 5 and added for this research for Level 1 students. The students performed the oral reading at the end of the 8th week of class. At that point, nearly all of the course content had been covered and the students tested had persisted through most of the course, controlling for the English language instructional time among the participants.

The oral reading was timed twice, once by the interviewer and a second time by the researcher, at a later date, to establish 1 minute samples. Any samples of fewer than 50 students were discarded, and when a sample was longer than a minute, the first 60 seconds were evaluated and the rest discarded.

The measure of reading comprehension was a 17–20 page final exam, given at each of the three proficiency levels and covering material in the course. Each exam was written to cover the curriculum at that level. The exams were all administered in a 3.5 hour exam period during the last week of the class. The exams were carefully scrutinised by full-time faculty in the program for consistency of exercise types. The exams consisted of many sections focused on grammar and vocabulary as well as a reading passage with five comprehension questions. A separate listening comprehension exam was given in the language laboratory. Because the final exam is at the end of the 10-week course, all students have been through a similar instructional experience, which adds further stability to the final exam variable. Choosing a curriculum-based, comprehensive written test as a measure of reading comprehension is supported by the Interactive Compensatory Reading Model (Bernhardt, 2005) which predicts that a significant portion of second language reading proficiency is related to the student's second language grammar level. The format of the exam had been used, with minor incremental modifications, for more than 20 years of the program's existence, but had never been validated or tested for reliability.

RESULTS

The descriptive statistics of the data can be seen in Table 4. The number of words correct per minute varied from a mean of 118 words correct per minute for Polish students to a mean of 83 words correct per minute for Chinese students. Ranking the data in order of mean number of words correct per minute, it can be seen that the two language groups whose first language orthography is the closest to English (Polish and Spanish) read the largest number of English words correctly in a minute. This was followed by the

TABLE 4
Mean fluency scores according to first language ($N = 232$)

L1	*Number*	*WCPM* (SD)
Polish	143	117.84 (20.74)
Spanish	14	105.50 (23.80)
Ukrainian	33	101.70 (25.65)
Bulgarian	9	90.56 (32.12)
Chinese	23	83.22 (20.73)
Other languages	10	105.40 (17.55)

WCPM, words correct per minute.

Ukrainians, whose first language orthography, Cyrillic, does not use the English alphabet, but is both alphabetic and transparent, and followed by the Bulgarians, whose Cyrillic orthography is alphabetic but more opaque than Ukrainian (Ellis et al., 2004). Finally, the Chinese, whose orthographic system is logographic and least similar to that of English, read the fewest number of words correct in a minute.

Correlations on the data showed a correlation of 0.256 between the oral reading fluency of the students and their final exam scores ($p \leq .010$, $n = 232$) (Table 5). When the sample was viewed by level in program, the correlation between fluency and final exam scores increased from Levels 1 to 3 and again from Levels 3–5. When expressed as a ratio of miscues divided by total words read, the correlation for Level 5 students reached $-.460$ ($p \leq .001$). Notably, these correlations are lower than the correlations found in oral reading of L1 English students (e.g., Fuchs et al., 1988, 2001).

ANALYSIS BY FIRST LANGUAGE

If the correlations are broken into subgroups by first language (Table 6), a similar pattern to the descriptive statistics is observed. The strongest correlation between oral reading and silent reading comprehension can be found for L1 Spanish students, whose correlations reached $r = .556$ ($p \leq .050$). The only other group of students for whom a correlation was found was the Polish students, whose oral reading fluency and final exam scores correlated at $r = .244$ ($p \leq .010$).

Although the correlation for Polish students was at a lower level, the level of significance was higher, due to the larger sample size. The other first language groups, Ukrainian, Bulgarian, Chinese, and Other languages, had lower correlations. This may have been due partly to the smaller sample sizes. However, it is noteworthy that there is a relationship between correlations with fluency and first language orthography. In effect, the two language groups whose first language orthographies are a close match with the English alphabet, Polish and Spanish, showed correlations between their oral and silent reading, whereas their counterparts from several L1 orthographies dissimilar to English did not.

TABLE 5
Correlations for measures of oral reading fluency and other measures by level ($N = 232$)

Measure	*Final exam*
WCPM	
Level 1 ($n = 14$)	.040
Level 3 ($n = 154$)	.270**
Level 5 ($n = 64$)	.410**
Miscue ratio	
Level 1	−.060
Level 3	−.290**
Level 5	−.460**

WCPM, words correct per minute.
**Significant at the .010 level.

TABLE 6
Correlations for measures of oral reading fluency and final exam by first language ($N = 232$)

Measure	*Final exam*
WCPM	
Polish($n = 143$)	.244**
Ukrainian ($n = 33$)	.104
Chinese ($n = 23$)	.147
Spanish ($n = 14$)	.556*
Bulgarian ($n = 9$)	.523
Other languages ($n = 10$)	.300

WCPM, words correct per minute.
*Significant at the .050 level.
**Significant at the .010 level.

Chinese performance on fluency measures and other measures

Fluency scores of Chinese students were significantly below those of students from other language groups; however, their scores on the final exam and language lab final exam were comparable to students from other orthographies, as can be seen in Table 7.

DISCUSSION

The descriptive statistics and correlations for the students' mean fluency scores and final exam scores indicate that something about the students' first language may be affecting fluency scores and that may well be orthography. Although the students performed equally well on the final exam and the language lab exam regardless of their first language, there was a dramatic difference in their words correct per minute scores on the timed reading of an unfamiliar passage. In addition, the fluency scores of students who were at a higher proficiency level in English showed a relationship with their silent reading comprehension, but fluency scores of students at a lower proficiency level (Level 1) did not. This suggests that assessing reading comprehension through timed oral readings, at least in postsecondary educated adult English learners, may be influenced by first language orthography. Students less familiar with the English alphabet may require more time to become proficient at decoding and pronouncing English than their peers from alphabetic orthographies similar to English, especially when they are at lower proficiency levels.

TABLE 7
Mean and standard deviation for final exam and language lab final exam by first language ($N = 232$)

L1	*Final exam mean%* (SD)	*Language lab final mean%* (SD)
Polish	81.36 (9.64)	85.10 (9.10)
Ukrainian	79.14 (10.83)	81.00 (11.30)
Chinese	77.87 (10.37)	80.57 (8.87)
Spanish	82.14 (9.52)	76.86 (20.20)
Bulgarian	79.67 (13.26)	80.67 (16.27)
Other languages	82.96 (6.15)	83.30 (10.20)
Total	80.75 (9.90)	83.32 (10.89)

These results suggest that care should be taken to avoid making judgments or placements related to an adult English language learner's reading comprehension based on scores obtained in an oral reading, at least at lower levels of proficiency. From an instructional standpoint, the results suggest that student whose orthographic backgrounds are distant from the English system can benefit from abundant practice in decoding and pronouncing English words, even when they are educated and literate in their first language.

Although the sample size is substantial, some of the languages are not as well represented as others, and they are not equally well represented at all of the instructional levels in the program. A replication of the study would benefit from having larger numbers of students from all of the languages at all of the levels. It would also be of interest to see whether or not children in dual language programs who are becoming simultaneous bilinguals, rather than studying English for the first time as adults, show evidence of orthographic interference from their first language. Researchers in reading and applied linguistics should also compare oral reading and silent reading scores of learners studying target languages other than English (Bernhardt, 2005). While orthography may not be a decisive variable in second language proficiency, it appears to play some role in oral reading fluency, and this should be noted accordingly.

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